START

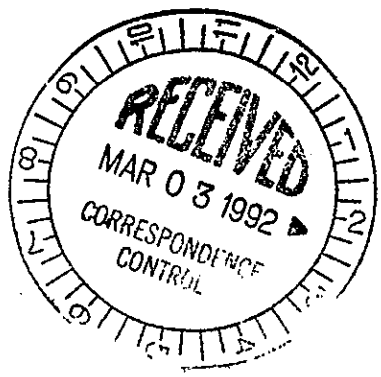
0019345

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

9201553

FEB 26 1992

92-WOB-059



Contractors, Richland, Washington

General Manager
Kaiser Engineers Hanford Company

President
Westinghouse Hanford Company

Gentlemen:

WASTE MANAGEMENT DIVISION (WMD) SURVEILLANCE NO. WMD-LSM-92-005

I am forwarding for your action the WMD surveillance report "HDPE Liner Installation at the Liquid Effluent Retention Facility." The surveillance was conducted during the months of December 1991, and January and February 1992.

This surveillance requires no formal response. However, three observations raise points of concern which should be addressed by your Quality Control supervisors.

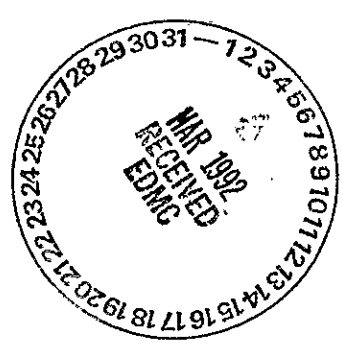
If you have any questions, you may contact Mr. L. S. Mamiya of the Waste Management Division (376-1471).

Sincerely,

L. C. Williams, Director
Project Management Division

Attachment

cc w/att:
S. L. Petersen, KEH
L. R. Tollbom, WHC
R. J. Julian, WHC
B. Davis, SWEC
R. X. Gonzalez, SWEC
C. Adair, SWEC
D. McShane, KEH



9201539

DOE-RL SURVEILLANCE REPORT

Division: Waste Management Division

Surveillant: Lance Mamiya/Bruce Davis/Richard X. Gonzalez**Surveillance Number:** WMD-LSM-92-005

Date: 2/8/92

Contractor: Kaiser Engineers

Location/Facility: Liquid Effluent Treatment Facility (LERF)

Title: High Density Polyethylene (HDPE) Liner Installation at the LERF

Subject/Scope of Surveillance:

The installation of the 60 mil HDPE liner in basins 44, 43, and 42 at the LERF was observed. Quality Control records were perused. These QC records concerned: 1) the qualifications of the manufacturer (SLT North America), the installation contractor (NILEX), and the supervisor/welders; 2) the testing of the welding equipment, 3) the testing of liner seams and welds and 4) the Acceptance Inspection Report for the bottom of basin 44. Construction methods and QC records were evaluated for compliance with those requirements established in W-105-C2; section 1.3, paragraphs 1.3.1, 1.3.3, & 1.3.5.1; section 2.1, paragraph 2.1.1.2; and section 3.3, paragraphs 3.3.1, 3.3.2, & 3.3.5.

Surveillance Summary:

On January 30, 1991, Richard Gonzalez visited the offices of KEH and met with Dave McShane and Tony Walsh (KEH-QC). During this visit QC records were perused.

The HDPE utilized at the LERf basins appeared to be in compliance with the specifications required by W-105-C2, section 2.1.1.2. Records confirming that the HDPE was within the requirements of the specifications were on file at KEH. Representative copies of these records were made and are on file with other background information utilized in this surveillance.

Prior to beginning construction of the LERF HDPE liners, certificates of experience were obtained from the HDPE maufacturer (SLT North America) and the liner installation contractor (Nilex) in accordance with W-105-C2 section 1.3. Copies of the following documentation were obtained and were observed to be on file in the KEH office:

* A certified letter, dated February 8, 1991, from SLT North America, Inc. to Ground Improvement Techniques (GIT) attesting to the fact that SLT "has successfully manufactured over 10,000,000 square feet of liner for Hydraulic Lining installations and meets the NSF requirements for manufacturing HDPE." Included with this letter was a list of projects/clients for which SLT manufactured HDPE.

* Letter from Ground Improvement Techniques (GIT) certifying that Nilex has successfully completed at least 10 projects involving the installation of HDPE liners with a cumulative total of greater than 10,000,000 square feet. Included with this letter was a list of projects/clients for which Nilex installed HDPE liner.

* Resume's for numerous Nilex personnel demonstrating experience in the installation of HDPE liners. These included resume's for the five welding technicians and the supervisor directly involved in the installation of HDPE at the LERF facility. Each of these six personnel have over 2,000,000 square feet of HDPE installation experience.

On at least a weekly basis, during the months of December, 1991 and January and February, 1992, the installation of 60 mil HDPE at the LERF facility was observed by the surveillants. It was observed that the construction techniques being utilized by Nilex appeared to be in compliance with requirements established by W-105-C2. During this period, the first layer of HDPE was completely installed in basins 44 and 43.

Field weld samples were taken before beginning daily production welding of the liner in accordance with W-105-C2 section 1.3.5.1, as modified by ECN W-105-155. This ECN allowed for the discretionary use of non destructive testing for the seam samples.

A ten foot long start up test weld was made prior to beginning welding each day for each welder utilized that day. At least three, (beginning and end of each shift, and at least once during shift) six foot long seam samples from installed welded sheeting were taken for each welder utilized on a given day. These samples were split in two, with one half of the sample being tested by Nilex onsite and the other half being given to KEH-QC. KEH-QC transferred this split to TRI/Environmental for independent testing. At least 5 specimens of each sample were destructively tested. If a liner sample passed the destructive test it was not tested nondestructively (as per ECN W-105-155).

Fusion welders were utilized for the majority of continuous seams connecting seperate HDPE panels. Fusion welding consists of placing a heated wedge, mounted on a self propelled unit, between two overlapped sheets, of HDPE, such that both sheets are heated to temperatures of approximately 370 degrees F. After being heated by the wedge, the overlapped edges pass through a set of preset pressure rollers that compress the panels together forming a continuous homogenous fusion weld. The weld seam created by the fusion welding process is composed of two welded seams seperated by an unwelded channel approximately 3/8 of an inch wide. This type of seam allows for testing by inflating the sealed channel with air. Nondestructive air pressure testing of these seams consisted of inflating this channel to a pressure of, at least, 60 psi for a period of 15 minutes.

When a fusion weld was not appropriate (i.e., as a result of weld geometry and/or location) extrusion welding was utilized. Extrusion welding consists of introducing a ribbon of molten resin along the edge of the seam overlap of the two sheets to be welded. The molten polymer causes some of the material on each sheet to be liquified making a homogenous bond between the molten weld bead and the surfaces of the sheets. Nondestructive testing of extrusion welds consisted of vacuum box testing. The vacuum box consisted of a rigid housing, a transparant viewing window, a soft gasket attached to the bottom of the box, a valve assembly, and a vacuum guage. This testing procedure consisted of: 1) placing soap solution over the area to be tested, 2) placing the box over the area with sufficient force to seal the box against the liner, 3) applying a vacuum of 4 to 6 pounds per square inch for approximately of 15 seconds, and 4) observing the tested section for signs (i.e., bubbles) of a seam defect.

If air pressure testing of a fusion weld indicated a leak: 1) the section of the weld which caused the test failure was identified and isolated (i.e., cuts made above and below the section), 2) seam sections above and below the isolated section were air pressure tested for integrity, 3) a failing seam section was repaired by placing (extrusion welding) a piece (patch) of liner material (typically round) over the section, and 4) cuts made to isolate the leak were patched. Patches extended approximately six inches beyond all sides of the section being repaired. All patch seams were vacuum box tested.

On February 4, 1991, Richard Gonzalez observed vacuum box testing of an extrusion weld in basin 42. This testing appeared to adequately determine the quality of the welded seam. A vacuum was imposed on all seam sections while observing for signs of a seam defect. However, the technician performing the vacuum box test was allowing the vacuum to hold for only 5 to 10 seconds. W-105-C2, section 3.3.1.2 (b), requires that 4 to 6 psi of vacuum be maintained "for a minimum of 15 seconds".

OBSERVATION 1: Vacuum box testing being performed at the LERF basins were not in strict compliance with the time requirements of W-105-C2, section 3.3.1.1 (b). This specification requires that a vacuum be held for a "minimum 15 seconds". It is recommended that KEH-QC require Nilex to comply with this requirement.

9 2 1 2 5 0 1 9 9 2

"Liner trial weld data" collected by Nilex for the period December 13, 1991 thru January 9, 1992 was perused. These records indicate that seam samples tested by Nilex were within the specified requirements for tear resistence and peel adhesion strentgh. A copy of this data was obtained and is on file. These records also indicate that records are being kept in accordance with W-105-C2 section 3.3.5.

However, it was difficult to discern, from these records, that an individual welder/technician (fusion or extrusion) was tested at least three times on any given shift. In order to do so, one would have to peruse several data sheets while noting the date, welder's identification number, technician's name, and time of day. It is suggested that such test records indicate more clearly that a given test represents the required (beginning shift, middle of shift, and end of shift) test for a given welder/technician on a given day.

OBSERVATION 2: Testing records, collected by Nilex, are not easily discernable as to what represents the beginning, midday, and end of shift test for a given welder/technician. It is suggested that, where appropriate, these records be revised to more clearly indicate that a given test represents a given welder/techician test record.

Records of seam tests performed by the independent testing laboratory TRI/Environmental (TRI) were on file at KEH and were perused for this surveillance. These records represent the results of tests performed on the split (qualification and field weld) sample obtained from Nilex. These records indicate that seam samples tested by TRI were within the specified requirements for tear resistence and peel adhesion strentgh. A representative copy of this data was obtained and is on file. These records also indicate that records are being kept in accordance with W-105-C2 section 3.3.5.

A brief comparison was made between the liner trial weld data collected by Nilex and that collected by TRI. The Nilex data appeared to be significantly

higher than the TRI data. For instance the morning qualification for welder #730 on 12-16-91 showed the following average results: Peel adhesion strentgh Nilex - 157 lbs, TRI - 114 lbs; Shear strength Nilex - 196 lbs, TRI - 156 lbs. The midday qualification for welder #730 on 12-16-91 showed the following average results: Peel adhesion strength Nilex - 158 lbs, TRI - 139 lbs; Shear strength Nilex - 197 lbs, TRI - 161 lbs. However, these differences are not considered consequential, since all test values reported by both Nilex and TRI indicated seam strentghs well above that required by W-105-C2 (i.e., shear strentgh - 108 lbs, peel adhesion strentgh - 72 lbs).

A preliminary as built drawing of the first HDPE liner in basin 44 was reviewed. This drawing clearly indicated the approximate position all HDPE panels, seams, and repairs (patches). Included on this drawing was a listing of each seam and patch, the date the seam/patch was tested, and an indication that the test results were positive.

A random sampling of the test results of basin 44 seams were perused. These results indicated that the seams indicated on the preliminary as built drawing had been tested in accordance with WHC-105-C2.

The listing of patches shown on the preliminary as built drawing indicated the date the patch was tested and the fact that the patch passed a vacuum box test. This appeared to be the only record of patch testing. Conversations with KEH-QC personnel indicated that this was the only record of patch testing and that there was no record of why a particular patch was made. There are several reasons why a patch was made, these include: 1) to connect two, or more, HDPE panel corners, 2) to repair a blemish (scratch, hole, thin spot, etc.), and 3) to repair a seam which failed an air pressure test.

OBSERVATION 3: The reasons why a patch is made on the HDPE liner is not being recorded. DOE-RL requests that the reason a patch is necessary be recorded along with testing records of that particular patch.

At the time of this surveillance, the floor of basin 44 was the only HDPE section which had undergone a final acceptance ("receiving") inspection by KEH-QC. This was done in order to transfer reponsibility for this section, from GIT, to KEH and to allow for the placement of drainage gravel in this basin. An acceptance inspection report (#55) was on file at KEH. This acceptance inspection report indicated that the entire surface of the bottom panels and 10 feet above the toe of the slope of basin 44 was not damaged. This is in compliance with the W-105-C2, section 3.3.4.

Surveillance Results:

Installation of HDPE at the LERF facility is largely being conducted in accordance with the specfications established by W-105-C2. However, it was observed that vacuum box testing was not being conducted in strict compliance with this specification. It is recommended that KEH require Nilex to hold a vacuum for a "minimum 15 seconds" on all seams tested by the vacuum box method.

It was also noted that, testing records collected by Nilex, are not easily discernable as to what represents the beginning, midday, and end of shift test for a given welder/technician. It is suggested that, where appropriate, these records be revised to more clearly indicate that a given test represents a given welder/techician test record.

Finally, the reasons why a patch is made on the HDPE liner is not being recorded. DOE-RL requests that the reason a patch is made be recorded along with testing records of that particular patch.

Management Debriefed: yes **Date:** 2/8/92

Formal Response Required: **Yes** [] **No** [x]

Author's Signature: Lauren J. Mayf **Date:** 2/21/92

cc: w/o attachment

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
LC Williams/RL	President/WHC etal	Incoming: 9201553

Subject: WASTE MANAGEMENT DIVISION (WMD) SURVEILLANCE NO. WMD-LSM-92-005

INTERNAL DISTRIBUTION

Approval	Date	Name	Location	w/att
		Correspondence Control	A3-01	X
		President's Office		X
		RJ Bliss		X
		LE Borneman	B2-35	X
		SL Bradley		
		LC Brown	H4-51	X
		CJ Geier	B2-19	X
		WH Hamilton, Jr. (Assignee)		X
		KR Jordan		X
		RJ Julian	R1-48	X
		DE Kelley	R1-48	X
		MK Korenko		X
		RE Lerch		X
		HE McGuire (Level I)		X
		DE McKenney	T3-28	X
		RD Morrison	B2-35	X
		MJ Oliva	B2-16	X
		RS Pavlina	S4-25	X
		SM Price	H4-57	X
		FA Ruck III	H4-57	X
		AR Schade		X
		JO Skolrud	B2-20	X
		RG Slocum		X
		LR Tollbom	R3-30	X
		DA Turner	B4-55	X
		TC Varljen		X
		TB Veneziano		X
		EP Vodney		
		RD Wojtasek	L4-92	X
		Project Files	R1-28	X
		EDMC	H4-22	X
		ESQ Data	L4-86	X
		Audit Program Adm.	B5-20	X

Distribution corrections: Marian Cram - phone 6-4123 - MSIN: A3-01 or cc:Mail